

3. (Currently Amended) The method for producing a semiconductor device according to claim 1, further comprising ~~the steps of~~:

forming an insulation layer on said silicon oxide layer; and

planarizing said insulation layer with a chemical mechanical polishing process or a plasma etching process from a surface side of said insulation layer without exposing said fluorine-doped silicon oxide layer.

4. (Currently Amended) A method for producing a semiconductor device including formation of an interlayer insulating film having a fluorine-doped silicon oxide layer ~~on~~ over a substrate, the method comprising ~~the steps of~~:

forming said fluorine-doped silicon oxide layer in a process chamber; and

removing a surface layer of said fluorine-doped silicon oxide layer by sputtering in the same process chamber subsequent to the formation of said fluorine-doped silicon oxide layer and prior to formation of an insulating layer over the fluorine doped silicon oxide layer.

5. (Currently Amended) The method for producing a semiconductor device according to claim 4, further comprising ~~the steps of~~:

forming an insulation layer ~~on~~ over a surface layer of said fluorine-doped silicon oxide layer after the sputtering; and

planarizing said insulation layer with a chemical mechanical polishing process or a plasma etching process from a surface side of said insulation layer without exposing said fluorine-doped silicon oxide layer.